WHAT IS CLAIMED IS:

1. A cryotherapy system comprising:

a plurality of cryoprobes, each such cryoprobe having a shaft with a closed distal end adapted for insertion into a body and conduits for flowing a cryogenic fluid through the shaft to reduce a temperature of the distal end;

a source of the cryogenic fluid;

a plurality of flow-control metering valves in fluid communication with the conduits of the plurality of cryoprobes and with the source of the cryogenic fluid;

a compressor in fluid communication with the conduits of the plurality of cryoprobes to define a self-contained fluid system; and

a computer processor adapted to control the plurality of flow-control metering valves and the compressor to provide desired flows of the cryogenic fluid through the conduits of the self-contained fluid system.

2. The cryotherapy system recited in claim 1 wherein the self-contained fluid system is an open-loop system.

3. The cryotherapy system recited in claim 1 wherein the self-contained fluid system is a closed-loop system.

4. The cryotherapy system recited in claim 1 wherein:

the cryogenic fluid is a gas; and

each such cryoprobe further has a heat exchanger disposed within the shaft in thermal communication with the conduits of such cryoprobe.

5. The cryotherapy system recited in claim 4 wherein:

each of the plurality of cryoprobes includes a Joule-Thomson port disposed in the distal end of the shaft in thermal communication with the heat exchanger; and

the computer processor is further adapted to control operation of each of the Joule-Thomson ports.

6. The cryotherapy system recited in claim 1 wherein:

the cryogenic fluid is a liquid; and

the computer processor is adapted to control the compressor and plurality of flow-control metering valves to provide an initial flow of the liquid through the conduits of

the cryoprobes under physical conditions near a critical point of a liquid-vapor system for the liquid,

whereby vapor lock associated with freezing of the cryoprobes is avoided.

7. The cryotherapy system recited in claim 6 wherein the computer processor is further adapted subsequently to reduce a pressure of the liquid in the cryoprobes, whereby colder liquid temperatures may be maintained without vapor lock after the initial flow is established.

8. The cryotherapy system recited in claim 6 wherein the compressor comprises a submersible pump for compressing ambient cryogenic liquids.

9. The cryotherapy system recited in claim 8 wherein the compressor comprises a heat exchanger to remove heat of compression through heat exchange of the compressed cryogenic liquid with the ambient cryogenic liquids.

10. The cryotherapy system recited in claim 8 wherein:

the plurality of cryoprobes are in fluid communication with the submersible pump through respective supply lines; and

the computer processor is further adapted to set a freeze power of the plurality of cryoprobes by regulating flow through the respective supply lines.

11. The cryotherapy system recited in claim 6 wherein the compressor comprises a push-pull bellow system and a linear actuator motor.

12. The cryotherapy system recited in claim 11 wherein the computer processor is further adapted to control a force exerted by the linear actuator motor to set a pressure of the cryogenic liquid.

13. The cryotherapy system recited in claim 6 further comprising a source of warmed gas in fluid communication with the flow-control metering valves, wherein the computer processor is further adapted to control the flow-control metering valves to initiate flow of the warmed gas through the conduits as part of an active thaw procedure.

14. The cryotherapy system recited in claim 1 wherein the computer processor is further adapted to determine the desired flows from predefined imaging parameters.

15. The cryotherapy system recited in claim 1 wherein the predefined imaging parameters correspond to a definition of freeze margins in the body.

16. The cryotherapy system recited in claim 1 wherein:

each of the plurality of cryoprobes further has a plurality of multifunction electrical wires; and

the computer processor is adapted to monitor the operation of the multifunction electrical wires.

17. The cryotherapy system recited in claim 16 wherein the computer processor is adapted to monitor operation of the multifunction electrical wires to monitor a temperature.

18. The cryotherapy system recited in claim 16 wherein the computer processor is adapted to monitor operation of the multifunction electrical wires to provide heat.

19. The cryotherapy system recited in claim 16 wherein:

the body is a living body; and

the computer processor is adapted to monitor the operation of the multifunction electrical wires to stimulate a nerve within the living body.

20. The cryotherapy system recited in claim 16 wherein the computer processor is adapted to monitor the operation of the multifunction electrical wires to permit spatial localization of the cryoprobes.

21. The cryotherapy system recited in claim 1 wherein:

the ends of the cryoprobes comprise an electrically insulating material; and

the computer processor is further adapted to force current between the ends of the cryoprobes to heat intervening portions of the body.

22. The cryotherapy system recited in claim 1 wherein the computer processor is further adapted to initiate injection of a cryosensitizing substance into the body.

23. A computer-readable storage medium having a computer-readable program embodied therein for directing operation of a cryotherapy system including a

plurality of cryoprobes, each such cryoprobe having a shaft with a closed distal end adapted for insertion into a body and conduits for flowing a cryogenic fluid through the shaft to reduce a temperature of the distal end, a source of the cryogenic fluid, a plurality of flow-control metering valves in fluid communication with the conduits of the plurality of cryoprobes and with the source of the cryogenic fluid, a compressor in fluid communication with the conduits of the plurality of cryoprobes to define a self-contained fluid system, and a computer processor, wherein the computer-readable program includes:

instructions for controlling the plurality of flow-control metering valves and the compressor to provide desired flows of the cryogenic fluid through the conduits of the self-contained fluid system.

24. The computer-readable storage medium recited in claim 23 wherein the self-contained fluid system is an open-loop system.

25. The computer-readable storage medium recited in claim 23 wherein the self-contained fluid system is a closed-loop system.

26. The computer-readable medium recited in claim 23 wherein:

the cryogenic fluid is a gas;

each such cryoprobe further has a heat exchanger disposed within the shaft in thermal communication with the conduits of such cryoprobe and has a Joule-Thomson port disposed in the distal end of the shaft in thermal communication with the heat exchanger; and

the computer-readable program further has instructions for controlling operation of each of the Joule-Thomson ports.

27. The computer-readable storage medium recited in claim 23 wherein:

the cryogenic fluid is a liquid; and

the computer-readable program further has instructions for controlling the compressor and plurality of flow-control metering valves to provide an initial flow of the liquid through the conduits of the cryoprobes under physical conditions near a critical point of a liquid-vapor system for the liquid,

whereby vapor lock associated with freezing of the cryoprobes is avoided.

28. The computer-readable storage medium recited in claim 27 wherein the computer-readable program further has instructions for controlling the compressor and plurality of flow-control metering valves to reduce a pressure of the liquid in the cryoprobes,

whereby colder liquid temperatures may be maintained without vapor lock after the initial flow is established.

29. The computer-readable storage medium recited in claim 23 wherein the computer-readable program further has instructions for determining the desired flows from predefined imaging parameters..

30. The computer-readable storage medium recited in claim 23 wherein:

each of the plurality of cryoprobes further has a plurality of multifunction electrical wires; and

the computer-readable program further has instructions for monitoring the operation of the multifunction electrical wires.

31. A system for determining a temperature within a body, the system comprising:

a current source;

a voltage-measurement device;

a wire within the body and in electrical communication with the current source and voltage-measurement device; and

a controller in electrical communication with the current source and voltage-measurement device, and adapted to:

supply a measurement current to the wire with the current source;

measure a forward voltage with the voltage-measurement device while holding the measurement current substantially constant;

reverse a direction of the current by applying a negative of the measured forward voltage to the wire with the current source;

measure a reverse voltage with the voltage-measurement device while the direction of the current is reversed;

determine a resistance of the wire from the measured voltages to account for a thermal electromotive force differential associated with measurement leads in electrical communication with the wire; and

determine the temperature from the determined resistance and a calibrated variation of resistance with temperature.

32. The system recited in claim 31 wherein the wire is comprised by a cryotherapy probe having a shaft with a closed distal end adapted for insertion into the body, conduits for flowing cryogenic fluid within the shaft, and a post disposed within the closed distal end, the wire forming a plurality of turns about the post.

33. The system recited in claim 31 wherein the wire is comprised by a probe containing at least one temperature measuring point.